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EXAMINER
MARTELLO, EDWARD

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/806,333	UEDA ET AL.	
	Examiner	Art Unit	
	Edward Martello	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *23 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/23/2004, 4/19/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show figure 5A as described in the specification, page 27, line 5. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawings. MPEP § 608.02(d).

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: S33 in figure 22. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 25 is rejected under 35 U.S.C. 101 as the claimed invention is directed to non-statutory subject matter. The claim recites "computer-readable recording medium" which

comprises "printed matter or the like" as defined in the specification, page 51, line 7. Printed matter or the like are non-statutory subject matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi et al. (U. S. Patent 5,946,479, hereafter '479) and in view of Nishiura (U. S. 2002/0052720 A1, hereafter '720).

Regarding claim 1, Sakaguchi teaches a mesh dividing device for performing a mesh dividing process of an analytical target model provided as three-dimensional CAD data into cuboids (hexahedrons) for numerical-analysis, comprising:

a mesh dividing unit ('479; fig. 3, mesh generation unit) for performing a mesh dividing process ('479; fig. 25) so as to divide said analytical target model, based on a parameter kit (user input file; '479; initial condition/boundary condition storage unit, col. 8, ln. 45-46 & ln. 51-55)

with parameters for division-control for dividing said analytical target model into said cuboids and said three-dimensional CAD data, into cuboids (hexahedrons) of less than or equal to the maximum number of cuboids (hexahedrons) included in said selected parameter kit (user input file; '479; initial condition/boundary condition storage unit, col. 8, ln. 45-46 & ln. 51-55) ('479; fig. 25, S611);

but does not teach a library for previously storing two or more kinds of parameter kits, each including a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of said cuboids (hexahedrons) or a selecting unit for selecting at least one of said two or more kinds of parameter kits stored in said library.

Nishiura, working in the same field of endeavor, however, teaches a library (analysis information file unit; '720; fig. 2, ¶ 0100) for previously storing two or more kinds of parameter kits (analysis information files) ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) and a selecting unit for selecting at least one of said two or more kinds of parameter kits (analysis information files) stored in said library ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) for the benefit of allowing the user to easily reuse previously input data for additional test runs that are normally performed during a typical product design process. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Sakaguchi and Nishiura to provide multiple, user selectable input parameter files, each including a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of said cuboids (hexahedrons) for the benefit limiting the simulation run time and to allow easy reruns of a numerical analysis of a 3D model using a mesh dividing device.

5. In regards to claim 2, Nishiura further teaches a device further comprising a display unit (‘720; fig. 1 & 2; ¶ 0042) capable of displaying various kinds of information including the contents of said two or more kinds of parameter kits (analysis information files) (‘720; “Open an existing file” … “data base of previous analyses;” ¶ 0077) stored in said library, said display unit displaying the contents (‘720; ¶0048) of said selected parameter kit (analysis information file) (‘720; fig. 3; “Open an existing file” … “data base of previous analyses;” ¶ 0077).

6. Regarding claim 3, Nishiura further teaches a device further a comprising parameter kit (analysis information file) designating unit (analysis information file unit; ‘720; fig. 1 & 2) by which the operator designates one of said two or more kinds of parameter kits (analysis information files) (‘720; “Open an existing file” … “data base of previous analyses;” ¶ 0077) stored in said library while referring to a display provided by said display unit (‘720; fig. 3; “Open an existing file” … “data base of previous analyses;” ¶ 0077), wherein said selecting unit selects a parameter kit (analysis information file) designated by said parameter kit (analysis information file) designating unit to be said selected parameter kit (analysis information file) (‘720; fig. 3; “Open an existing file” … “data base of previous analyses;” ¶ 0077).

7. In regards to claim 4, Nishiura further teaches a device further comprising a modification unit (analysis information file unit; ‘720; fig. 1 & 2) by which said operator modifies the contents of a parameter kit (analysis information file) designated by said parameter kit (analysis information file) designating unit while referring to a display provided by said display unit (‘720; fig. 3; “Open an existing file” … “data base of previous analyses;” ¶ 0077), wherein said selecting unit selects a parameter kit (analysis information file) modified by said modification unit to be said selected parameter kit (analysis information file).

8. Regarding claim 5, Nishiura further teaches a device further comprising a saving control unit (analysis information file unit; '720; fig. 1 & 2; ¶0043 - for accumulating analysis information on an analysis object which is entered on the respective input screens by the input unit) for storing the contents of a parameter kit (analysis information file) modified by said modification unit into said library according to an instruction externally given by said operator ('720; fig. 1 & 2; ¶ 0043).

9. In regards to claim 6, Sakaguchi and Nishiura teach the mesh dividing device according to claim 2 and Sakaguchi further teaches a device further comprising a reference component designating unit by which the operator designates a reference component from the components of said analytical target model while referring to a display provided by said display unit ('479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-5), wherein said mesh dividing unit handles said reference component designated by said reference component designating unit, and a component smaller than said reference component, as exception to target for said mesh dividing process ('479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-23).

10. Regarding claim 7, Sakaguchi and Nishiura teach the mesh dividing device according to claim 3 and Sakaguchi further teaches a device further comprising a reference component designating unit by which the operator designates a reference component from the components of said analytical target model while referring to a display provided by said display unit ('479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-5), wherein said mesh dividing unit handles said reference component designated by said reference component designating unit, and a component smaller than said reference component, as exception to target for said mesh dividing process ('479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-23).

11. In regards to claim 8, Sakaguchi and Nishiura teach the mesh dividing device according to claim 4 and Sakaguchi further teaches a device further comprising a reference component designating unit by which the operator designates a reference component from the components of said analytical target model while referring to a display provided by said display unit (‘479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-5), wherein said mesh dividing unit handles said reference component designated by said reference component designating unit, and a component smaller than said reference component, as exception to target for said mesh dividing process (‘479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-23).

12. Regarding claim 9, Sakaguchi and Nishiura teach the mesh dividing device according to claim 5 and Sakaguchi further teaches a device further comprising a reference component designating unit by which the operator designates a reference component from the components of said analytical target model while referring to a display provided by said display unit (‘479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-5), wherein said mesh dividing unit handles said reference component designated by said reference component designating unit, and a component smaller than said reference component, as exception to target for said mesh dividing process (‘479; fig. 19, col. 21, ln. 60-67, col. 22, ln. 1-23).

13. In regards to claim 10, Sakaguchi and Nishiura teach the mesh dividing device according to claim 6 and Sakaguchi further teaches a mesh dividing device where in said mesh dividing unit handles a component of which at least one of the maximum outer dimensions in the three axial directions is less than or equal to the corresponding one of the maximum outer dimensions in the three axial directions of said reference component, as exception to target for said mesh dividing process (‘479; col. 28, ln. 30-47).

14. Regarding claim 11, Sakaguchi and Nishiura teach the mesh dividing device according to claim 7 and Sakaguchi further teaches a mesh dividing device wherein said mesh dividing unit handles a component of which at least one of the maximum outer dimensions in the three axial directions is less than or equal to the corresponding one of the maximum outer dimensions in the three axial directions of said reference component, as exception to target for said mesh dividing process (‘479; col. 28, ln. 30-47).

15. In regards to claim 12, Sakaguchi and Nishiura teach the mesh dividing device according to claim 8 and Sakaguchi further teaches a mesh dividing device wherein said mesh dividing unit handles a component of which at least one of the maximum outer dimensions in the three axial directions is less than or equal to the corresponding one of the maximum outer dimensions in the three axial directions of said reference component, as exception to target for said mesh dividing process (‘479; col. 28, ln. 30-47).

16. Regarding claim 13, Sakaguchi and Nishiura teach the mesh dividing device according to claim 9 and Sakaguchi further teaches a mesh dividing device wherein said mesh dividing unit handles a component of which at least one of the maximum outer dimensions in the three axial directions is less than or equal to the corresponding one of the maximum outer dimensions in the three axial directions of said reference component, as exception to target for said mesh dividing process (‘479; col. 28, ln. 30-47).

17. In regards to claim 14, Sakaguchi and Nishiura teach the mesh dividing device according to claim 2 and Nishiura further teaches a mesh dividing device wherein said selecting unit automatically selects said selected parameter kit (analysis information file) based on said three-dimensional CAD data (‘720; ¶ 0105).

18. Regarding claim 15, Nishiura further teaches a mesh dividing device wherein said selecting unit computes, based on said three-dimensional CAD data, shape-feature information and physical-property-feature information about said analytical target model or components of said analytical target model, and selects a parameter kit (analysis information file) corresponding to the computed shape-feature information and physical-property-feature information, to be said selected parameter kit (analysis information file) (‘720; ¶ 0014 - 0106).

19. In regards to claim 16, Nishiura and Sakaguchui further teach a mesh dividing device wherein said library previously classifies and stores said two or more kinds of parameter kits (analysis information files) (‘720; “Open an existing file” … “data base of previous analyses;” ¶ 0077) each being brought into correspondence with levels of shape-feature information and physical-property-feature information which are assumed for said analytical, target model; and said selecting unit selects a parameter kit (analysis information file) corresponding to levels to which the computed shape-feature information and physical-property-feature information belong, to be said selected parameter kit (analysis information file) ('479; col. 17, ln. 46-67, col. 18, ln. 1-11).

20. Regarding claim 17, Sakaguchi and Nishiura teach the mesh dividing device according to claim 15 and Sakaguchi further teaches wherein said shape-feature information includes information about the scale (comparison of size) of said analytical target model and implementation forms (materials, physical constants etc.) of components in said analytical target model (‘479; col. 31, ln. 32-54).

21. In regards to claim 18, Sakaguchi and Nishiura teach the mesh dividing device according to claim 16 and Sakaguchi further teaches wherein said shape-feature information includes

information about the scale of said analytical target model and implementation forms of components in said analytical target model ('479; col. 31, ln. 32-54).

22. Regarding claim 19, Sakaguchi and Nishiura teach the mesh dividing device according to claim 17 and Sakaguchi further teaches wherein said implementation form is information about volume distribution in said analytical target model ('479; col. 31, ln. 32-54).

23. In regards to claim 20, Sakaguchi and Nishiura teach the mesh dividing device according to claim 18 and Sakaguchi further teaches wherein said implementation form is information about volume distribution in said analytical target model ('479; col. 31, ln. 32-54).

24. Regarding claim 21, Sakaguchi and Nishiura teach the mesh dividing device according to claim 15 and Sakaguchi, further teaches a mesh dividing device wherein said physical-property-feature information is information about thermal conductivity distribution in said analytical target model ('479; col. 29, ln. 57 – 67, col. 30, ln. 1 – 15).

25. In regards to claim 22, Sakaguchi and Nishiura teach the mesh dividing device according to claim 2 but do not teach the device further comprising a conversion time estimating unit for estimating, based on said selected parameter kit (analysis information file), a conversion time required for said mesh dividing unit to perform a mesh dividing process for said analytical target model, wherein said display unit displays said conversion time estimated by said conversion time estimating unit. Sakaguchi, however, teaches a device implementing a method to estimate the size of the mesh to generated ("479; col. 3, ln. 44-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the size estimation methods of Sakaguchi to provide a time estimating means for the benefit of allowing the user to adjust the

mesh division size and/or other parameters so that the analysis is completed in the user's desired timeframe.

26. Regarding claim 23, Sakaguchi and Nishiura do not teach the method of claim 22 wherein said conversion time estimating unit measures a time required for a simplified mesh dividing process for said analytical target model, the simplified mesh dividing process being performed on the basis of said selected parameter kit (analysis information file), and estimates said conversion time to be a value obtained by multiplying the measured time by a predetermined coefficient. Sakaguchi, however, teaches a device implementing a method to estimate the size of the mesh to generated ("479; col. 3, ln. 44-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the size estimation methods of Sakaguchi, as applied to a simplified mesh of the analytical target model, to provide a time estimating means and apply a predetermined coefficient to scale the result for the benefit of allowing the user to quickly adjust the mesh division size and/or other parameters so that the analysis is completed in the user's desired timeframe.

27. In regards to claim 24, Sakaguchi and Nishiura teach he mesh dividing device according to claim 1, and Sakaguchi further teaches said parameters for division-control include the number of the mesh-division in the three axial directions (‘479; col. 29, ln. 38-56) but does not teach including tolerances in the three axial directions, and a volume conversion rate. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the parameter driven methods of Sakaguchi, as applied to mesh-division control in three axis, by adding parameters of tolerance and volume rate to provide mesh-division functionality expressed in these dependent quantities for the benefit of allowing the user to quickly adjust the mesh

division size and/or other parameters so that the analysis is completed to the user's desired metrics.

28. Regarding claim 25, Sakaaguchi teaches a computer-readable recording medium in which a mesh dividing program for instructing a computer to function as a mesh dividing device for performing a mesh dividing process to divide an analytical target model provided as three-dimensional CAD data into cuboids (hexahedrons) for numerical-analysis ('479; fig. 25, S611, and parameters for division-control for dividing said analytical target model into said cuboids (hexahedrons),

but does not teach wherein said mesh dividing program includes a library for previously storing two or more kinds of parameter kits (analysis information files) each including a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of said cuboids (hexahedrons) and parameters for division-control for dividing said analytical target model into said cuboids (hexahedrons) , and instructs said computer to function as a selecting unit for selecting at least one of said two or more kinds of parameter kits (analysis information files) stored in said library, and a mesh dividing unit for performing a mesh dividing process so as to divide said analytical target model, based on a parameter kit (analysis information file) selected by said selecting unit and said three-dimensional CAD data, into cuboids (hexahedrons) of less than or equal to the maximum number of cuboids (hexahedrons) included in said selected parameter kit (analysis information file).

Nishiura, working in the same field of endeavor, however, teaches a computer-readable recording medium contain computer executable methods to perform the steps of previously storing multiple kinds of parameter kits (analysis information files) as a library (analysis

information file unit; '720; fig. 2, ¶ 0100) ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) and a selecting unit for selecting at least one of said two or more kinds of parameter kits (analysis information files) stored in said library ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) for the benefit of allowing the user to easily reuse previously input data for additional test runs that are normally performed during a typical product design process. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Sakaguchi and Nishiura to provide multiple, user selectable input parameter files, each including a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of said cuboids (hexahedrons) for the benefit limiting the simulation run time and to allow easy reruns of a numerical analysis of a 3D model using a mesh dividing device.

29. In regards to claim 26, Sakaguchi teaches a method for setting, when performing a mesh dividing process to divide an analytical target model provided as three-dimensional CAD data into said cuboids (hexahedrons), a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of cuboids (hexahedrons) for numerical-analysis ('479; fig. 25, S611, and parameters for division-control for dividing said analytical target model into said cuboids (hexahedrons),

but does not teach it comprising the steps of: previously storing two or more kinds of parameter kits (analysis information files), as a library, each including said maximum number of cuboids (hexahedrons) and said parameters for division-control; selecting at least one of said two or more kinds of parameter kits (analysis information files) stored in said library, when performing a mesh dividing process for said analytical target model; and setting a maximum

number of cuboids (hexahedrons) and a parameter for division-control included in the selected parameter kit (analysis information file), on a unit for performing said mesh dividing process.

Nishiura, working in the same field of endeavor, however, teaches the steps of previously storing multiple kinds of parameter kits (analysis information files) as a library (analysis information file unit; '720; fig. 2, ¶ 0100) ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) and a selecting unit for selecting at least one of said two or more kinds of parameter kits (analysis information files) stored in said library ('720; "Open an existing file" … "data base of previous analyses;" ¶ 0077) for the benefit of allowing the user to easily reuse previously input data for additional test runs that are normally performed during a typical product design process. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Sakaguchi and Nishiura to provide multiple, user selectable input parameter files, each including a maximum number of cuboids (hexahedrons) which defines the upper limit of the number of said cuboids (hexahedrons) for the benefit limiting the simulation run time and to allow easy reruns of a numerical analysis of a 3D model using a mesh dividing device.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 20040148145 A1	System and method of interactively generating a family of mesh models
US 6535211 B1	Numerical analysis mesh generating method and apparatus
US 20020144231 A1	Hexahedral mesh generation method and device

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward Martello whose telephone number is (571) 270-1883. The examiner can normally be reached on M-F 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EM/

Examiner, Art Unit 2628

/XIAO M. WU/
Supervisory Patent Examiner, Art Unit 2628